

Newark - Division of Water

DEPARTMENT OF PUBLIC AFFAIRS
CITY OF NEWARK, NEW JERSEY
ANNUAL REPORT
OF THE
DIVISION OF WATER
FOR
1936

ANNUAL REPORT

OF THE

BUREAU OF WATER SUPPLY

(DIVISION OF WATER)

FOR 1936

BUREAU OF WATER SUPPLY

COVERING

COLLECTION, PURIFICATION, TRANSMISSION AND CEDAR GROVE RESERVOIR

FOR YEAR 1936.

ALFRED B. ANDERSON

ASSISTANT ENGINEER - IN CHARGE

COLLECTION

PRECIPITATION ON PEQUANNOCK WATERSHED

The precipitation on the Pequannock Watershed as determined from the average of observations at three locations, Canistear, Oak Ridge, and Charlotteburg, amounted to 54.70 inches for the year 1936. This is considerably above the normal, which for the years of record since 1893 is 48.4 inches. The rainfall was well distributed through the year. July with 1.68 inches of rain, was the driest month and March with 9.17 inches of precipitation was the wettest.

STORAGE AND DEPLETION - PEQUANNOCK RESERVOIRS

The full storage of about 12,000 million gallons in the Pequannock Reservoirs existed during January and from the middle of March to the middle of April. From then the reservoirs were steadily depleted, with two minor interruptions of the decline, until December 3rd when the maximum depletion of slightly more than 4,700 million gallons occurred. Oak Ridge Reservoir was then drawn down 24.5 feet, and Clinton Reservoir 13.5 feet. Canistear Reservoir was practically full throughout the year, being drawn down only 0.5 feet on December 3rd. By the end of the year storage had increased to about 9,700 million gallons, a depletion of about 2,400 million gallons.

WATER DIVERSION

A total of 13,688.1 million gallons of water were diverted from the Pequannock Watershed during 1936 as contrasted with 13,059.9 million gallons in 1935, an increase of 628.2 million gallons.

From Wanaque Reservoir 7507.2 million gallons of water were taken by Newark in 1936 as

ANNUAL REPORT
OF THE
DIVISION OF WATER

Mr. James W. Costello, Chief Engineer
Department of Public Affairs
Newark, New Jersey

Dear Sir:

The annual report of the various Bureaus of the Division of Water
for the year 1936 is herewith submitted.

Respectfully,

WGB:FM

WILLIAM G. BANK
DIVISION ENGINEER

compared with 7050.0 million gallons in 1935, an increase of 457.2 million gallons.

Month by month figures of the amount of the 1936 diversions are shown on the last two columns of Table II of this report.

The Pequannock diversion figures differ from the figures of consumption of Pequannock water by the amount of the gain or loss in storage in Cedar Grove Reservoir. The total consumption of Pequannock water as seen in the next paragraph is less than Pequannock diversion by 38.5 million gallons, which agrees with the net gain in Cedar Grove Reservoir storage during the year 1936.

WATER CONSUMPTION

The total consumption of water in the Newark system for the year 1936 was 21,156.8 million gallons, an average of 57.8 million gallons daily, an increase of 1,015.8 million gallons or 2.6 million gallons daily, from the 1935 figure of 20,141.0 million gallons total for the year and 55.2 million gallons daily. Of this, 13,649.6 million gallons (37.3 million gallons daily) were from the Pequannock supply and 7507.2 million gallons (20.5 million gallons daily) from the Wanaque supply as compared with 13,091.0 million gallons (35.9 million gallons daily) from the Pequannock in 1935 and 7,050.0 million gallons (19.3 million gallons daily) from the Wanaque in 1935.

Of the total 1936 consumption of 57.8 million gallons daily, 47.9 million gallons daily were consumed in Newark and 9.9 million gallons daily were delivered to other systems. For details see Tables No. I and No. II of this report.

PEQUANNOCK WATERSHED

THOMAS P. BYRNES, SUPERINTENDENT

In addition to the regular routine which was carried out, the following extra work was accomplished:

RESERVOIRS

Brush was cut and burned around the shore lines of Canistear, Clinton, Oak Ridge and Echo Lake Reservoirs. Ice was removed from overflows of the above reservoirs and at Macopin Intake. The rip rap on the spillway at Oak Ridge was relaid and the fences and fence gates at all reservoirs were repaired.

STREAMS

Brush was cut and cleaning done along the banks of Kanouse Brook, Pequannock River, Oak Ridge, Williamsville, Timberbrook, Canistear and Dunker Pond Brook, and Earl's Pond, Wallace Pond, Kanouse Brook and Timberbrook were treated with copper sulphate.

The river bed in Oak Ridge stream was straightened out and the slopes rock paved.

SANITATION

Garbage was collected and disposed of throughout the watershed area, and all toilets and cesspools were cleaned. Eighty-one (81) dead deer were buried, thirty (30) toilets were repaired, thirty-two (32) new single vaults, four (4) new double vaults and twelve (12) new cesspools were installed and seven (7) new toilet buildings constructed. The toilet cans for Civilian Conservation Corps and Dutch Elm Crews were also cleaned.

INSPECTION

The watershed was patrolled with horses and cars, toilets were inspected, streams walked, tree plantations guarded, trespassers driven off and recreation centres guarded.

RECREATION CENTRES

Three large parks were maintained for picnic parties.

FOREST FIRES

Fire lanes at pine groves were plowed. There were five railroad and three other fires and 2 1/2 acres of grass and 4-1/2 acres of woods were burned over.

CITY OWNED BUILDINGS

Buildings on properties No. 6, 70A, 145, 171 and 62 were repaired and painted and a barn on property 177 was razed. House No. 5 was totally destroyed by fire.

PILING FOR PORT NEWARK

A total of 2,023 piles were cut and hauled for Port Newark.

ROADS

Gravel was hauled and roads repaired at Charlotteburg and New City.

CORDWOOD

Sales of cordwood were much less than last year, due to decreased cutting by Civilian Conservation Corps. 600 cords were furnished to the Relief Organization in Newark for distribution to the poor.

CIVILIAN CONSERVATION CORPS WORK

Timberbrook Swamp was ditched, drained and partially planted. A new storage reservoir was constructed to supply water to the nursery and several City buildings, and 1,075 feet of the old pipe line was replaced with 3-inch pipe. 13.2 miles of horse trails were built. 350,000 trees and 13,000 pounds of walnuts were planted on the watershed during the year.

SAFEGUARDING AND PURIFICATION

CEDAR GROVE LABORATORY

J.F.D. BAUERMANN

ASSISTANT BACTERIOLOGIST IN CHARGE

The procedures of the American Public Health Association and the United States Public Health Service, supplemented by methods found better adapted to our own supply, were followed in the laboratory. The latter methods serve the purpose of checking the former. The following samples from various sources were examined:

<u>Source</u>	<u>Microscopical</u>	<u>Bacteriological</u>
Station #1 and 2 Great Notch	602	609
Station #3 Cedar Grove Reservoir Effluent	301	303
Station #5 Belleville Reservoir Influent	---	2
Station #6 Belleville Reservoir Effluent	279	283
Station #7 Wanaque at Belleville	301	299
Station #8 So. Orange Ave. Reservoir Effluent	---	242
Station #9 Central Avenue and Ninth Street	---	55
Station #15 Macopin Intake	48	45
Station #16 Upper Macopin Intake	8	8
Station #17 Echo Lake Brook	50	48
Station #20 Kanouse Brook	53	52
Station #25 Clinton Brook	54	52
Station #30 Oak Ridge Brook	53	52
Cedar Grove Reservoir Proper	19	---
Canistota Reservoir Proper	6	---
New Pipe Lines in Newark	---	126
Station #1 and #2 Below Intake	---	11
Belleville Reservoir Proper	17	4
Echo Lake Reservoir Proper	6	---
Earl Pond	4	---
Wallace Pond	3	---
Stockholm Brook	2	---
Timber Brook	1	---
Pequannock River	5	1
Wanaque by-pass at Belleville	5	---
Special Samples	35	84
	---	---
TOTAL	1852	2276

CHEMICAL SAMPLES

- 12 Monthly Chemical Analyses complete, of Delivered Pequannock Water.
 1 Chemical Analysis for the City of Elizabeth Water Department.
 5 Samples of Sewage for the Division of Sewers.
 1 Sample of well water.
 1 Sample, special, Division of Water.
 1 Sample of Rock Drillings from New City Well.

In addition to the above chemical analyses there were a large number of pH values determined and free chlorine, free ammonia, free carbon dioxide, dissolved oxygen and nitrite tests were performed, some as daily routine and others on dirty water problems.

MICROSCOPY

<u>Source</u>	<u>Date Reported</u>	<u>Date Treated</u>	<u>Date Treatment Stopped</u>	<u>Microorganism</u>
Kanouse Brook	April 28	May 9	May 13	Stiglecolum
Grimshaw Pond	April 28	May 9	May 14	"
Hebrum Brook	April 28	May 9	May 13	Algae Growths
Oak Ridge Brook below Dam	April 28	May 9	May 13	" "
So. Orange Ave. Res. at Inlet		June 3	June 3	" "
Oak Ridge below Dam	-----	July 16	July 19	" "
Kanouse Brook	-----	July 16	July 20	" "
Clinton Brook at Post Road	-----	July 28	Aug. 1	
Charlotteburg Pond	Aug. 5	Aug. 13	and for a period	Grass Removed
Cedar Grove Reservoir	Aug. 13	Aug. 19	Aug. 19	Synedra, Tabellaria
Belleville Reservoir	Aug. 24	Aug. 27	Aug. 27	Synedra
Belleville Reservoir	Aug. 31	Sept. 1	Sept. 1	Synedra
Earl Pond	Oct. 8	Oct. 9	Oct. 9	Uroglena, Dinobryon
Boho Lake Reservoir	Aug. 14	Cleared up on standing		Anabaena, Bosmina
Canistear Reservoir	Oct. 20	" " " "		Aphanizomenon

In the above locations, copper sulphate was used to treat the troublesome microorganisms.

Branchipus appeared as usual at intervals during the summer, though the distribution was more general than heretofore.

BACTERIOLOGY

On January 9th, a road condition at Cedar Grove Reservoir, caused water to overflow the curb and enter the reservoir. This condition, a menace to health, was immediately reported and corrected.

At Apahwa Lake, a suspected case of typhoid fever was reported on July 11th. As this place is adjacent to our watershed we investigated the water supply of the home involved and it was found in excellent condition.

During the summer months, South Orange Avenue and Belleville Reservoirs, due to bacteriological conditions, had to be chlorinated. Full details are given under Purification.

On October 3rd a complaint from the Town of Bloomfield, relative to sickness in one family, was investigated. The water was found to be of excellent quality and in no way to blame.

On December 22nd, a man who had just returned from South America, was found working on a W.P.A. project at Cedar Grove Reservoir. This man had had an attack of yellow fever, and having not fully recovered, was immediately transferred.

CHEMISTRY

The routine monthly chemical analyses were made during the year. A number of pH values were determined and free chlorine, dissolved oxygen and free carbon dioxide tests were made at intervals during the year.

On June 29th a complaint of taste in water on Brown Street in the Sherwin-Williams plant, was investigated and coal tar was found to be the cause.

From the vicinity of Munn, Chelsea and Tremont Avenues, about March 11th, came complaints of dirty water. Tests conducted at the time, showed that in the vicinity the water must remain for a period in a dead end, as small pieces of gelatinous organic matter would appear at the tap. East of this area is a section of unoccupied property containing dead ends.

During the spring and early summer a section of No. 2 Pequannock pipe line was cement lined. In comparison with the No. 1 Pipe Line, not cement lined, it was found that with both lines in service, the No. 2 Line showed a slight increase in pH Value when first placed in service but apparently it has taken on a protective coating as the pH Values of both lines are now the same.

A sample of rock drillings from New City was tested in October.

PURIFICATION - SANITATION

Ortho-Tolidine tests for free chlorine reaction are made hourly, on both pipe lines, at Macopin Intake. These are further checked at Great Notch by the Laboratory.

The Bacteriological flora in Belleville Reservoir was such that the reservoir was by-passed and treated with chlorine on May 15th. On May 22nd it was again placed in service.

Belleville Reservoir required further treatment on July 13th and at this time permanent treatment for the summer months was recommended. Daily treatment of this reservoir was begun with Chlorine and Ammonia on July 17th. On August 19th ammonia was discontinued and only straight chlorine used. Treatment was discontinued on September 30th.

About May 12th, South Orange Avenue Reservoir began showing the presence of Coli-Aerogenes

Group. On May 20th, this reservoir was recommended for daily chlorination and treatment with chlorine and ammonia was begun on June 2nd. The ammonia was discontinued on September 21st and chlorine treatment discontinued on September 24th.

At Macopin Intake Treatment plant the use of Chloramines was resorted to from May 13th to November 14th and straight chlorine used the rest of the year.

WANAQUE SUPPLY

Daily Bacteriological, Microscopical and Chlorine Residual tests were made of the Wanaque Supply at the Belleville take off, as in previous years.

On February 14th and 26th small fish, of the herring variety clogged up a meter at Commercial Street and Raymond Plaza East, a section supplied by Wanaque Water.

Branchipus was found in sections supplied by Wanaque this summer and complaints due to taste and dirty water were more frequent than heretofore, in the Wanaque area.

SUMMARY

The past year has found the water systems of both Pequannock and Wanaque taxed above ordinary, due to the elements. We have seen extreme cold, flood conditions, extreme heat and long periods of drought, with increased consumption. It is to be noted that under all these conditions, both systems stood up well and complaints were at a minimum.

TRANSMISSION LINES AND CEDAR GROVE RESERVOIR

ALFRED B. ANDERSON
ASSISTANT ENGINEER

During the year the usual work necessary to maintain and operate the 62.43 miles of steel transmission pipe lines has continued.

As in past years, a careful inspection of the entire transmission system was made each week to locate any trouble that might cause an interruption to the supply. All air valves were operated to release entrapped air at the high points on the pipe lines and all other valves and appurtenances were inspected. All leaks were reported and necessary repairs were subsequently made.

A crack in the cast iron Venturi tube on pipe line No.1 at Macopin was welded but due to the uncertainty in welding cast iron, a new section was purchased and stored at the Little Falls yard, so that in the event the weld failed, a new section could be installed in the shortest possible time.

On September 19, 1936, two new Chronoflo meters were purchased and installed at the old Venturi House below Macopin and rates and quantities are now electrically transmitted to a new panel board established at the Chlorine Plant. The recording mechanism on the panel board designate the rates of flow and total quantities. These new meters materially assist the chlorine plant operator in adjusting chlorine dosages as well as aiding in the operation of the pipe lines.

In order to assure an uninterrupted supply to The Town of Belleville, at Milton Street, an additional connection was made to the No.2 line and cross connected to the No.1 line. This connection was made in anticipation of reconditioning the No.1 pipe line.

MAINTENANCE OF RIGHT-OF-WAY

The usual maintenance work of the pipe line right-of-way, was continued during the year. Cross ditches for surface water were cleaned, and grass on the right-of-way mowed as required.

CEDAR GROVE RESERVOIR

The usual work in connection with maintaining the grounds on the Cedar Grove Reservation was continued through the year. Mowing of grass on the dams and around the city-owned buildings, together with the transplanting of trees from the nursery, constituted the bulk of the summer work. During the winter, repairs were made to the wire fence enclosing the reservoir and to city-owned buildings on the reservation.

NEW CONSTRUCTION (Cement Lining)

The cement lining of Pequannock Pipe Line No.2 under Contract 34 was completed on June 2, 1936. Under this contract 17,955 lineal feet of 1 1/4-inch cement lining, 8,998 lineal feet of 5/8-inch cement lining and 598 lineal feet of 1-inch cement lining were placed, making a total of 27,551 lineal feet of pipe lined with cement mortar, (measured along the axis of the pipe).

In order to facilitate the operation of the pipe lining machinery, the contractor was permitted to cut sections from the top of the pipe. These plates were replaced and welded by the contractor and as an added precaution, city forces welded additional straps across the plates and down the sides of the pipe.

When the contract work was completed, an inspection was made of the pipe interior from Macopin Intake to Rempson Notch and then chlorinated before being put back in service.

ENAMEL LINING (Works Progress Administration)

The reconditioning of the No.2 Pequannock Steel Pipe Line, between Brookdale and Belleville, which was started in 1934 as a Civil Works Administration Project, continued as a Works Progress Administration Project. The interior of the pipe is being cleaned, wire brushed, primed and coated with Bituminous Enamel. The Works Progress Administration project started November 14, 1935 and at the end of 1936, 13,000 lineal feet of pipe have been enamel lined. Of this amount, 4000 lineal feet were lined under Civil Works Administration in 1934 and 9,000 lineal feet lined under Works Progress Administration in 1936. In 1935 the Works Progress Administration forces did considerable cleaning and wire brushing but due to extenuating circumstances no enamel lining was done.

WOOD STAVE LINE

The wood stave line was used continuously throughout the duration of Contract 34, in conjunction with the No.1 steel line. At the completion of the cement lining contract, the wood stave line was shut off and used only to operate the chlorinators, as taking the water supply for the chlorinators from the wood stave line at 25 lbs. pressure, precludes the necessity of operating the electric pumps in the treatment plant.

RECOMMENDATIONS

Watershed - Reforestation - In the latter part of the year, inquiries were made to determine whether or not the Civilian Conservation Corps camps in the watershed could be used to drain the numerous swamps in the watershed and plant the meadow land with evergreens. With the present camps and equipment it is estimated that the work can be completed in about five years. It is therefore recommended that this five-year program be submitted to the Federal Government for approval.

Oak Ridge Reservoir - For the past several years, during the summer months, it has been necessary to treat the effluent from Oak Ridge Reservoir. The method of treating has proven that the treatment has been partially effective. It is recommended that a permanent treating station be constructed and provision made for a better distribution of the copper sulphate and also provide for future chlorination.

Macopin Intake - Due to leakage in the masonry of the Macopin Intake Dam, it will be necessary to empty the Reservoir and gunite the upstream face of the dam. It is advisable that this work be done as soon as possible since the wood stave line which will be required for service, while the guniting work is being done, is deteriorating very rapidly.

Pipe Lines - Additional air valves of the air release type should be placed on the No.1 and No.2 Pipe Lines at Pompton Notch and at the Decker Road, Smith Mills.

Chlorine Plant - An extension to the chlorine plant should be constructed for use as a field laboratory and a shed should be built to cover the one ton chlorine cylinders stored adjacent to the state highway.

ANNUAL REPORT
OF THE
BUREAU OF DISTRIBUTION
(DIVISION OF WATER)
FOR 1936.

BUREAU OF DISTRIBUTION

ROBERT O. SCHOLZ, ENGINEER IN CHARGE

ARTHUR J. SIMPSON, ASSISTANT ENGINEER

During the year 1936, all but necessary expenditures by Division of Water forces, for construction and maintenance work in the Distribution System, were curtailed.

Budget figures were again held to an absolute minimum.

Practically all main replacements and extensions in the system during the year, were made as Works Progress Administration Projects, under our supervision.

The following is a summary of the most important work accomplished by the Bureau of Distribution during the year.

Continuance and completion of Works Progress Administration Projects started in 1935. This work included the following:

State Highway Route #21 (McCarter Highway) - New 12-inch Low Pressure main from Bridge to Clay Streets, also intersections, hydrant setbacks and service transfers in advance of State Highway pavement.

Sanford Avenue - New 12-inch Low Pressure main from South Orange Avenue to Varsity Road. This is a very important part of necessary feeder extensions, planned to strengthen the Vailsburg district.

Location of Consumers' Services - This project was continued throughout the entire year. The work includes a check of all office records, a field survey and the preparation of standardized service maps.

In addition thereto, under Works Progress Administration Projects, the following work was started and completed during the year:

Madison Avenue - New 12-inch Low Pressure main from Bergen Street to South Seventeenth Street.

Lenox Street - New 12-inch Low Pressure main from Mead Street to Sanford Avenue.

Eighteenth Avenue - New 12-inch Low Pressure main from Stuyvesant Avenue to Mead Street.

Stuyvesant Avenue - New 12-inch Low Pressure main from Eighteenth Avenue to Lindsley Avenue.

South Thirteenth Street - New 12-inch Low Pressure main from Central Avenue to West Market Street.

Abington Avenue - New 8-inch Low Pressure main through new regulated connection from the 36-inch cast iron main on North Sixth Street to North Fourth Street.

North Fourth Street - New 8-inch Low Pressure main from Abington Avenue to Third Avenue.

Gouverneur Street - New 12-inch Low Pressure main from Broadway to Passaic Street.

Sixth Avenue - New 12-inch Low Pressure main from Clifton Avenue to Stone Street.

Elm Road - New 12-inch Low Pressure main from Oliver Street to Lang Street.

Niagara Street - New 12-inch Low Pressure main from Ferry Street to Konorn Street.

Broad Street - New 20-inch High Pressure main from Parkhurst Street to Poinier Street. This section of main was completed and placed in service in September of this year and completes the High Pressure grid along Broad Street and Frelinghuysen Avenue.

Additional Works Progress Administration Projects were approved during the year, covering main replacements and extensions together with other useful projects beneficial to the system. As a part of these projects the following work was started and carried on during the rest of the year.

Belmont Avenue - New 16-inch Low Pressure main from Clinton Avenue to Peddie Street.

Davenport Avenue - New 12-inch Low Pressure main from North Tenth Street to Neckel Street.

North Tenth Street - New 12-inch Low Pressure main from Davenport Avenue to Moniss Street.

Morenus Avenue - New 20-inch Low Pressure main from Raymond Boulevard to Wilson Avenue. This main will replace the existing 16-inch main which for some time has been very badly corroded from acid soil action. The new main will be encased in a lime, cement mortar to preclude any future corrosion from the surrounding soil.

Leak Detection Survey - This work is being conducted to determine and check water waste due to leakage, over the entire system. The work is being done at night, usually between 11:00 P.M. and 7 A.M., when there is a minimum of noise, by aquaphone and other leak detecting devices, and all house services, gate valves and hydrants are being checked by districts. The work also includes sewer manhole investigations for further check. All leaks found are promptly reported, and investigated and repaired by our own maintenance forces.

Hydrant Flow Tests - This work is being conducted primarily to determine hydrant capacities throughout the system in advance of painting our hydrants in accordance with color combinations, which will visually indicate their relative available fire service draft, as recommended by

Committees on Hydrant Markings of the American and New England Water Works Associations. Capacities will be rated based on a residual pressure of 20 pounds per square inch.

These flow tests will also prove invaluable to us in establishing the strength of the distribution system.

Hydrant Painting - This work includes the cleaning and painting of all hydrants in accordance with the new color combinations recommended by the Water Works Committees, to indicate their relative available fire service draft, which is of substantial value to the Division of Water and the Fire Department-.

All Low Pressure Hydrant barrels, regardless of class are to be painted chrome yellow, with the following identifying color combinations.

Class A - Flow capacity of 1000 gallons per minute or greater - Tops and Nozzle Caps - Green.

Class B - Flow capacity of 500-1000 gallons per minute - Tops and Nozzle Caps - Yellow.

Class C - Flow capacity of less than 500 gallons per minute - Tops and Nozzle Caps - Red.

These colors conform to those used in traffic signal work for safety, intermediate and danger.

In connection with all the Works Progress Administration Projects herein mentioned, a considerable amount of the materials and practically all of the labor, both unskilled and skilled, have been furnished as Federal contribution. This has resulted in a very material saving to the City of Newark and the work would in all probability not have been done at the time, as a nominal function of the Division of Water.

WORK DONE BY REGULAR FORCES OF THE BUREAU OF DISTRIBUTION

All necessary work in conjunction with Works Progress Administration Projects.

This work included preparation of Project applications and plans, supervision, preparation of cost records, intersection hook-ups, service transfers and other skilled work.

State Highway Route 21 (McLarster Highway) - Work in conjunction with Works Progress Administration Project which included hydrant set-backs, service transfers and intersection hook-ups.

Chester Avenue - Extension of 12-inch Low Pressure main under and across the tracks of the Erie R.R. Company to provide additional supply for Pittsburgh Plate Glass Company. This work involved jacking 36-inch diameter reinforced concrete pipe of special design, underneath the right of way of the Erie R.R. Company, to provide a pipe gallery for the water main. This type

of construction is now preferred, when possible, by the railroads.

Frelinghuysen Avenue - New 12-inch Low Pressure main extension from 36-inch Cast Iron main on VanVocht Street to Virginia Street.

South Iowa Street (Fort Newark) - New 6-inch Low Pressure main extension for fire protection on City Refuse Dump.

New York and Greenwood Lake Railroad Avenue - New 4-inch Low Pressure main extension from Summer Avenue, westerly 276 lineal feet, to replace old private service.

Montgomery Street - Relaying old 6-inch with 8-inch Low Pressure main from Belmont Avenue to Charlton Street.

Verona Avenue - Relaying old 4-inch with 8-inch Low Pressure main from Mt. Prospect Avenue to Clifton Avenue.

In addition, the Division section crews carried on, as far as conditions would permit, their regular inspection, maintenance and repairs on gate valves, hydrants and pressure regulators throughout the system.

No major breaks of importance occurred during the year.

All records were kept up to date, as usual, during the year.

The regular weekly inspection and maintenance of all recording instruments and gauges was continued.

DISTRIBUTION SYSTEM

The total length of pipe owned by the city is now 537.13 miles in the low pressure system and 28.66 miles in the special segregated high pressure fire system. Connected with the mains in the low pressure system are 4,320 fire hydrants and in the high pressure system 391. There are 8,469 gate valves which control the flow of water in the mains of the low pressure system and 270 gate valves controlling the flow of water in the high pressure system. There are 71,474 connections, known as services in the low pressure system, of which 54,397 are in use. Through these, water for domestic, commercial and public use is drawn. There are 307 connections in the high pressure system, of which 273 are in use. The water pressures in the low pressure system range from 30 to 130 pounds and in the high pressure system from 100 to 160 pounds per square inch.

STREET MAIN EXTENSION, LOW PRESSURE SYSTEM

The total extension to street mains in the city during the year 1936 was as follows:

19,184 lineal feet = 3,633 miles from 4" to 12" diameter.

The amount of work done in relaying was as follows:

4,675 lineal feet = 0.885 miles from 6" to 12" diameter.

The total amount of pipe of different diameters, deducting old pipe taken out and adding new pipe of larger size in place of the old pipe removed, consists of 2,836,039 lineal feet or 537.13 miles.

The number of low pressure taps made during the year was 122. Of these 43 were of 1-inch diameter, 20 of 1-1/2 inch, 26 of 2-inch, 7 of 3-inch, 4 of 4-inch and 17 of 6-inch diameter.

The total number of low pressure taps in the city at the end of the year 1936 was 71,474, while the number of taps in actual use was 54,397. The difference shows the services installed in advance of street pavements.

During the year 83 low pressure hydrants were set. Of these 43 were replacements of old hydrants, and 39 were additions to the number already in place; 3 hydrants were taken out and not replaced, making the total number of hydrants in the low pressure system:

In the City	4,272
Silver Lake Section and Belleville..	<u>48</u>
	4,320

STREET MAIN EXTENSION, SPECIAL SUBORDINATED HIGH PRESSURE FIRE SYSTEM

The extension of high pressure mains during the year 1936 was as follows:

1995 lineal feet = 0.378 miles 20" diameter.

The total amount of high pressure pipe of different diameters on December 31, 1936 was as follows:

151,456 lineal feet = 28.68 miles.

The total number of high pressure taps in the city at the end of the year 1936 was 307, while the number of taps in actual use was 273. The difference shows the services installed in advance of street improvement. The number of high pressure taps made during the year was 4.

During the year 5 high pressure hydrants were set, making a total of 391 high pressure hydrants in the city.

Mr. Frederick G. Scherer, Superintendent of Construction and Maintenance, reports that during the year 1936 there were 15 breaks on mains repaired and that a total of 3295 leaks covering mains, hydrants and services were investigated and when necessary, repairs were made. Poor pressure complaints investigated totaled 1470. There were 362 services cleaned out at the main and 1275 curb boxes set or repaired and 150 curb steps replaced. A total of 1496 hydrant repairs were made, this high percentage of the entire system being accounted for by improper and unauthorized use, together with a more comprehensive inspection and maintenance schedule.

Mr. Arthur R. Stemmler, Chief Plumbing Investigator, in charge of the Bureau of Inspection reports as follows:

Special investigations were made by the Bureau of Inspection investigating buildings and plants whenever illicit distilleries were raided by the Federal Authorities. The investigators found that in ten (10) of the plants raided either water connections were taken off on the street side of the water meter or the water meters found reversed.

Surveys and drawings of the water pipe layouts in manufacturing plants and service connections to buildings are being made and records in the form of maps are being completed and brought up to date for use by the Division of Accounts. Thousands of dollars of omitted accounts are now being added to the records. Water services marked in ledgers "dead or water off" have been

found alive and in use. In addition thereto unmetered high and low pressure fire services and hydrants, not charged for in years, have been discovered to be in use. Inspection is made of all new services as to their proper installation, also of all repaired and relaid services.

The Builders water return receipts amounted to Five Thousand and Twenty-Four Dollars and Twenty-Six Cents (\$5,024.26) and 196 demolitions were reported to the Division of Accounts for their records of turn off.

There were 200 anonymous complaints reported by property owners and by licensed plumbers, that handy men and unlicensed plumbers were tampering with the water meters and installing or repairing water piping and digging at curb water boxes without proper sidewalk permits.

In addition to the above the following work has been accomplished during the year:

Out of Town Meter Readings.....	1,196
Meter Inspections.....	1,413
Service Inspections.....	653
Special Investigations.....	5,280
Special Readings.....	403
Mason and Building Inspections.....	3,963
Water Searches.....	28
By-passes Sealed.....	71
Unmetered Fire Service Inspections....	796
Tap Inspections.....	103
Surveys and Drawings - 78 - covering..	488 Taps

Twenty-three (23) water meters supplying other municipalities are read weekly.

Special investigations were made of industrial plants and properties along the river front, to locate foreign water connections between the city water supply and private systems. Twenty-five (25) connections were found and the owners were notified to cut off and disconnect these cross-connections at once.

METER LABORATORY

The Meter Laboratory located at 332 South 8th Street, Newark, N.J. is responsible for the servicing and proper functioning of every water meter on Newark water lines. It also keeps an invaluable record of each meter, giving in detail, its location, size, make and number and a record of all tests, repairs and charges from the original date of purchase, until it is scrapped.

Its staff on December 31, 1936 consisted of 21 men made up of clerks, repairmen, mechanics, chauffeurs and laborers, covering office, shop and field work.

There were 7,673 meters serviced in varying degrees and covering the range of sizes and makes in service, a detail of which work follows:

1,095 damaged by frost
 1,797 stuck (various causes)
 180 damaged by heat
 1,182 miscellaneous tests
 1,003 inspections
 281 special readings
 45 periodic tests on premises
 369 minor repairs (glass, lids, etc.)
 234 sealed registers and couplings
 127 leaks stopped

In addition thereto 567 new meters were tested and 493 meters were condemned due to excessive wear, damage and obsolescence.

The stock room continued to function satisfactorily during the year. Meter parts and general supplies are in charge of one man, who is responsible for their disposition and replenishment. He is also charged with the receiving of all material and the handling of shipping when necessary. All drafts made on the stock room must be properly accounted and charged for, preventing pilfering and enabling us to anticipate our requirements more accurately. This also precludes running out of necessary parts and materials.

A new portable power drill with stand, added to the Meter Laboratory Equipment during the year has greatly facilitated the repair of gear trains and other meter parts.

The adoption of a new type of seal the latter part of this year should result in pronounced savings as the new type costs about 1/15th of the cost of the old copper seal formerly used. It is believed that the new seal will offer better security against tampering and it is more simply replaced.

Periodic field testing of meters, 2-inch and larger, was continued during the year and when time permits periodic testing of smaller meters is carried on by Meter Laboratory forces.

The card system, listing the names and signatures of licensed plumbers, functioned satisfactorily during the year. This offers a complete check on the handling of all meters either new or reconditioned, over the signature of a regular licensed plumber, which is required under our rules and regulations.

A check and inventory of all water meters in service, was inaugurated in April of this year and continued throughout the year. Accounting ledger records are being checked against Meter Laboratory records and Meter Readers' field binders.

Cooperation has been continued through conferences with and exchange of weekly reports between the Accounting Division, including meter readers and investigators, and the Meter laboratory and meter testing crews.

CONTINUERS' ACCOUNTS covering METER READING, BILLING AND COLLECTING, are included in a separate report submitted by the Chief Accountant of the Department of Public Affairs.

TABLE 1.

CONSUMPTION STATEMENT FOR YEAR ENDING DECEMBER 31, 1936.

MONTH	1936					
	Total consumption per month Million Gallons - Newark - Belleville - Bloomfield - Elizabeth - Mayno - Duckamuck - Elizabethtown Water Company - Verona.	Average daily consumption - Million Gallons - Newark and Suburbs.	Total Consumption per month - Million Gallons - Newark.	Average Daily Consumption - Million Gallons - Newark.	Average Temperature - Newark.	Rainfall - Inches Newark.
January	1711.6	55.2	1407.1	45.4	28.5	5.93
February	1676.7	57.8	1363.0	47.1	26.7	1.64
March	1673.3	54.0	1391.6	44.9	45.9	5.00
April	1631.4	54.4	1351.4	45.0	47.2	4.25
May	1827.3	58.9	1501.3	48.4	63.9	3.66
June	1773.9	59.1	1490.6	49.7	69.7	8.36
July	1956.2	63.1	1630.8	52.6	76.5	1.95
August	1382.7	60.7	1557.0	50.2	74.7	4.83
September	1821.9	60.7	1517.1	50.6	67.6	3.25
October	1786.3	57.6	1487.0	48.0	57.3	4.20
November	1662.4	55.4	1378.2	45.9	42.4	.79
December	1753.1	56.6	1463.4	47.2	38.8	6.84
TOTAL	21156.8	695.5	17540.5	575.0	639.2	50.70
AVERAGE		57.8		47.9	53.3	42.3

Estimated population of Newark by Board of Health, December 31, 1936 - - - - - 460,000.

Estimated population of Town of Belleville, December 31, 1936 - - - - - 28,000.

QUANTITIES OF WATER DELIVERED TO OTHER SYSTEMS

TABLE II.

1936										
		Bellefonte								
		Blacksburg								
		Elizabeth								
		Elizabethtown Water Company								
		Frederick								
		Essex County Overbrook Hospital - Verona								
		Wayne								
		Total								
		Received from Municipal								
		Quantities delivered from Fockmanack watershed								
Jan.	49.8	110.4	135.8	1.3	1.7	3.4	2.1	304.5	606.9	1007.5
Feb.	51.0	114.9	138.7	1.3	1.7	2.0	2.1	311.7	602.8	1013.5
Mar.	64.4	107.0	103.1	1.4	2.6	1.5	1.7	281.7	570.2	1177.0
Apr.	56.9	111.9	105.0	1.2	2.4	1.7	0.9	280.0	543.0	1107.7
May	60.6	117.7	122.3	1.5	3.9	1.9	1.1	326.0	641.0	1140.0
June	62.3	104.0	111.7	1.2	2.3	0.7	1.1	283.3	553.4	1228.6
July	65.5	114.7	131.0	1.4	3.9	7.5	1.4	325.4	665.9	1278.0
Aug.	60.3	114.7	137.0	1.5	4.3	6.7	1.2	325.7	724.9	1154.5
Sept.	58.6	111.0	128.0	1.4	3.1	1.5	1.2	304.8	707.0	1122.9
Oct.	60.9	105.4	123.5	1.4	2.8	4.2	1.1	299.3	641.9	1006.0
Nov.	51.5	102.0	122.1	1.4	2.0	4.3	0.9	284.2	593.4	1137.6
Dec.	49.3	102.0	129.7	1.4	2.2	4.3	0.8	289.7	623.9	1130.2
	691.1	1315.7	1504.9	16.4	32.9	39.7	15.6	3616.3	7507.2	13600.1

DEPARTMENT OF PUBLIC AFFAIRS
DIVISION OF WATER
NEWARK, N. J.

WATER SUPPLY STATISTICS
For Year Ending December 31, 1936.

Population by census, 1930.....	440,000
Date of construction.....	1889-1891
By whom owned.....	City of Newark
Source of supply.....	Pequannock and the Wanaque Watersheds
Mode of supply.....	Gravity

STATISTICS OF CONSUMPTION OF WATER

Population, City of Newark.....	460,000
Consumption, for the year, City of Newark.....	17,540.5 m.g.
Consumption, for the year, Town of Belleville.....	691.1 m.g.
Consumption, for the year, Town of Bloomfield.....	1,315.7 m.g.
Consumption, for the year, Town of Elizabeth.....	1,504.9 m.g.
Consumption, for the year, Township of Wayne.....	15.6 m.g.
Consumption, for the year, Packanack Lake.....	32.9 m.g.
Consumption, for the year, Elizabethtown Water Company.....	16.4 m.g.
Consumption, for the year, East Orange.....	None
Consumption, for the year, Verona, Overbrook Hospital.....	39.7 m.g.
Consumption, for the year, Town of Kearny.....	None
Total Consumption for the year.....	21,156.8 m.g.

Passed through meters in the city.....	14,709.4 m.g.
Percentage of consumption metered in the city.....	83.86 %
Average daily consumption, city and suburbs.....	57.8 m.g.
Average daily consumption in the city.....	47.9 m.g.
Gallons per day to each inhabitant in the city.....	104.13
Gallons per day to each tap in use in the city.....	876.17
Cost of supplying water per million gallons figured on total maintenance.....	\$74.40
Total cost of supplying water per million gallons figured on total maintenance, plus interest on bonds.....	\$121.68

STATISTICS REGARDING DISTRIBUTION SYSTEM

Mains, Low Pressure System

Kind of pipe.....	Cast Iron and steel
Sizes from.....	4-inch to 60-inch
Extended.....	19,184 feet during year
Discontinued.....	76 feet during year
Total now in use.....	537.13 miles
Number of hydrants added during the year.....	39
Number of hydrants discontinued during the year.....	3
Number of hydrants replaced with new or reconditioned hydrants.....	43
Number of public hydrants now in use.....	4,320
Number of stop gates added during the year.....	65
Number of stop gates now in use.....	8,469
Range of pressure on distributing mains.....	30 to 130 lbs

Mains, High Pressure System.

Kind of pipe.....	Cast Iron
Sizes from.....	6-inch to 30-inch
Extended.....	1,995 feet during year
Total now in use.....	28.68 miles
Number of hydrants added during the year.....	5
Number of public hydrants now in use.....	391
Number of stop gates added during the year.....	2
Number of stop gates now in use...(Revised list over system).....	270
Range of pressure on high pressure system.....	100 to 160 lbs.

Services, Low Pressure System.

Kind of pipe.....	Lead, brass and cast iron
Sizes from.....	5/8-inch to 6-inch
Total number of services in the City, January 1, 1936.....	71,481
Total number of services added during 1936 (5/8" to 6" diameter).....	122
Total number of services abandoned during 1936.....	129
Total number of services in City, January 1, 1937.....	71,474
Total number of regular services in use January 1, 1937.....	53,616
Total number of regular services in use metered January 1, 1937.....	53,414
Total number of regular services in use metered January 1, 1937.....	202
Percentage of regular services in use metered January 1, 1937.....	99.62%
Total number of fire line services in use January 1, 1937.....	781
Total number of fire line services in use metered January 1, 1937.....	92
Total number of fire line services in use unmetered January 1, 1937.....	689
Percentage of fire line services in use metered January 1, 1937.....	11.77%

Connections, High Pressure System.

Kind of pipe.....	Cast Iron
Sizes.....	1-1/2-inch to 6-inch
Number of connections added during the year.....	4
Number of connections in the city.....	307
Number of connections in use (1-1/2-inch to 6-inch).....	273
Number of meters added.....	1
Revised list of meters now in use.....	119
Percentage of connections in use metered.....	13.59%

ANNUAL REPORT
OF THE
BUREAU OF ENGINEERING
(DIVISION OF WATER)
FOR 1936.

BUREAU OF ENGINEERING

JAMES E. GARRATT

DISTRICT ENGINEER

GENERAL PLANNING

RELINING NO.2 PEQUANNOCK CONDUIT, MACOPIN TO POMPTON NOTCH - CONTRACT 34. - Contract 34 for cleaning and relining the No.2 Pequannock transmission aqueduct between Macopin Intake and Pompton Notch was completed on May 27, 1936. During the shut-down of this work from February 14th to March 31st because of severe winter conditions, tests were made to determine the extent of the restoration of carrying capacity by the cleaning and by the application of various thicknesses of cement-mortar lining. More complete tests were made during the fall of 1936 which showed that the recconditioning work, the first step of an extensive Program of Pequannock Transmission Aqueduct Work, outlined in the 1934 Annual Report, was highly successful and had restored the capacity of the 42-inch riveted steel pipe line to better than its original capacity when new. The final estimate of work performed on this contract was \$123,886.13. The total length of line recconditioned was 27,551 feet; 17,955 feet with 1/4-inch lining, 8,998 feet with 5/8-inch lining and 598 feet with 1-inch lining.

W.P.A. PROJECT OF RECONDITIONING PEQUANNOCK LINES TO BELLEVILLE RESERVOIR - Another step in the Pequannock Aqueduct Program, Works Progress Administration Project #3-110, approved November 13, 1935, for recconditioning the portions of the two original Pequannock transmission aqueducts between Broad Street, Bloomfield and Belleville Reservoir was continued during the year. The work consisted of cleaning the interior walls of the steel pipe and applying a bituminous enamel lining. "Bitumastic" Enamel made by the Walles Dove-Herniston Corporation, New York City, was used. Work was confined to the 42-inch No.2 line. The lining work was suspended between July 10th and September 15th when temperature and humidity conditions made it difficult to properly dry the steel surfaces for the application of the heated enamel, and when it was considered necessary to have the line filled and ready for service as a reserve for summer peaks of demand and emergency. About 5000 feet of pipe was relined, additional

to the 3000 feet previously completed as a Civil Works Administration Project. The work was very costly. It was continuing at the end of the year with about 10,000 feet of the 42-inch No.2 line remaining and nothing done in the 19,000 feet of 48-inch No.1 line.

60-INCH ALEXANDER AVENUE CONNECTING AQUEDUCT - In February 1936 the proposed 60-inch Alexander Avenue Connecting Aqueduct was worked up as a W.P.A. Project with the City to furnish the pipe and the Federal Government to provide funds for the rest of the work. Application on this basis was approved September 9, 1936 by W.P.A. (Serial No.3-7-586.) Negotiations for right-of-way for a portion of this line across private property continued throughout the year. No agreement was reached with the Upper Montclair Country Club, across one edge of whose golf course the line is to pass. Tentative specifications were prepared during the fall for the pipe for this work to be purchased by the City. Plans had been practically completed the previous year. Because of lack of right-of-way and of funds for the City's share of the cost, the City did not formally commit itself to this work as a W.P.A. Project.

OTHER PROPOSED AQUEDUCT-PROGRAM WORK - Progress was made during the year on studies and preparations for other construction proposed in the Program of Pequannock Transmission Aqueduct Work.

Contract Documents including Specifications were prepared for recconditioning the 48-inch No.1 line between Broad Street, Bloomfield and Belleville Reservoir by cleaning it and placing a cement-mortar lining in the pipe. Advertising for bids for this work was held up, pending sale of bonds to provide funds.

Study and layout of 48-inch pipe to replace the 36-inch steel line between Belleville Reservoir and the Bloomfield Avenue Tower was made during the summer. Specifications for the work, including tentative drafts for reinforced-concrete and welded-steel pipes, were started in July and continued from time to time during the remainder of the year. From further studies of transmission aqueduct capacity it was finally decided to supplement the 36-inch line with a 48-inch instead of replacing the 36-inch with 48-inch.

SUPPLIES TO OTHER MUNICIPALITIES

Bloomfield - Completing meter changes begun in 1935 on its various connections supplying water from the Newark system, the Town of Bloomfield installed a new Venturi meter and a re-

ording mechanism on the Grove Street at Bloomfield Avenue meter and a new recording mechanism on the Carrabrant Avenue meter. Recording mechanisms for these meters as well as for the Bloomfield Center meter are located in the Bloomfield Town Hall, electrically transmitted.

Belleville - For greater flexibility to their supply and in anticipation of reconditioning of the No.1 steel line from Great Notch to Belleville Reservoir, the Town of Belleville made connection to the No.2 steel line at Hilton Street during June, supplementing the connection to the No.1 line at this same location.

Nutley - Suit in Chancery asking that the Contract between the Town of Nutley and the Passaic Valley Water Commission for a water supply for the Town be voided, made little progress during the year. On December 29, 1936 motion to strike the Bill of Complaint of September 21, 1935 was served on the City.

OPERATING STUDIES

Flushing - The routine flushing of 21 groups of dead-ends comprising 301 dead-ends, and of 10 lists of areas in the vicinity of laundries and other locations where dirty water tends to accumulate requiring 196 hydrant operations, continued throughout the year except for the period from February 1, 1936 to March 11, 1936, when extremely cold weather and heavy accumulation of snow and ice on city streets caused its temporary discontinuance. The flushings were done about every two weeks and seemed effective as very few complaints of dirty water were received during the year.

Great Notch Regulator - The lack of capacity in the 60-inch Bloomfield Avenue supply main from Cedar Grove Reservoir brought the usual seasonal lack of pressure at the Bloomfield Avenue Tower, but earlier than usual. The need of support of this pressure by water directly from the Pequannock Watershed via the regulator at Great Notch Crossovers became apparent as early as the latter part of March. The regulator was opened on May 13th to support a pressure of about 27 pounds per square inch at the Notch corresponding to about 95 pounds at the Tower. On November 4th the regulator was closed as its help was no longer needed. On November 16th inlet and outlet valves were opened again with the regulator set to open at about 20 pounds in case of an emergency which would lower the Tower Pressure below 90 pounds. The regulator

did not open during the remainder of the year.

Hydrant Sprinklers - Permission to use a hydrant with a sprinkler-shower attachment under proper supervision for street bathing during the hot days of summer was issued to 116 persons. The first permit was issued during the latter part of June and all were called in on September 28th. In spite of this wholesale issuing of permits and in spite of radio-patrol efforts there was gross abuse of the privilege and hydrants were used extensively, at times, without shower attachment.

Wanaque Water - In addition to its regular use through the 60-inch supply line to the down-town section of Newark, Wanaque water was used twice during the year through the 30-inch connection at Belleville Reservoir, by-passing the reservoir to permit its treatment with copper sulphate. The first period was between May 14th and 23rd and the second between August 27th and September 9th.

In anticipation of litigation between the North Jersey District Water Supply Commission and the Passaic Valley Water Commission over the division of surplus revenues from the sale of Wanaque water to the City of Bayonne, in which revenues Newark has a large interest, a complete history was compiled of the Bayonne Contract and of the North Jersey District Commission's formula for the division of revenue therefrom.

Miscellaneous Studies - Preliminary studies were made for a new chlorine and venturi meter house at Valley Road and for a new regulator and vault at South Orange Avenue Reservoir for use when reservoir has to be put out of service for cleaning or treating.

A float and pan was designed for determination of evaporation from reservoir surfaces and two installations were made, one at Cedar Grove Reservoir and one at Macopin Intake Reservoir.

Layouts of installations of pressure-type air-release valves at several points on the Pequannock Lines in the vicinity of Pompton Notch were prepared and valves were ordered for the same.

RECORDS

Pequannock Properties - Maps of the individual city-owned properties on the Pequannock Watersheds were about 80% completed at the end of 1936. Titles to these properties were searched. Property lines were surveyed on approximately 40 tracts of land for purposes of planting, reforestation and swamp drainage. Maps were prepared by city forces and surveys made by Civilian Conservation Corps Engineer and crew.

As of December 31, 1936 individual maps on pipe-line right-of-way are 90 percent complete. Survey of right-of-way from Belleville to Macopin Intake for the purpose of tying in each individual right-of-way conveyance is in progress.

Tax appeals were defended and an agreement reached with West Milford Township. Tax appeals were also filed against Town of Clifton and reductions were granted amounting to \$1950.00. Tax appeal filed against Town of Bloomfield on pipe-line right-of-way was refused by County and State Boards of Taxation.

Plans were made and tentative agreement was reached to turn over ten (10) acres of land located on River Road, Belleville, to the Essex County Park Commission.

Searches were completed on the William P. Penney, E.R. Greenwood, Augusta Boyd and the Estate of John Rutherford tracts. Foreclosure proceedings started on the William P. Penney and E.R. Greenwood tracts on which we hold tax title certificates. Eviction suit was started on the Augusta Boyd tract against Stephen Bailey. Arrangements were made to clear up outstanding tax title certificates against the Estate of John Rutherford of which we own a 1/32nd interest.

A new fire insurance schedule was put into effect covering all buildings and their contents owned by the Division and resulting in an appreciable saving to the City.

Operating Maps - Operating maps and records were revised and expanded from time to time during the year to keep up with changes in the system. Record drawings of the 60-inch Bloomfield Avenue line from Cedar Grove Reservoir to the Tower were completed during May 1936. A diagrammatic plan and profile of this line, on one sheet, was prepared similar to those previously prepared for the Pequannock transmission lines.

Water Statistics - Tabulations of rainfall, run-off, evaporation, temperature, water consumption, chemical characteristics of water and other statistics pertaining to the water-supply were kept up to date and in form for distribution to interested parties. Floods of major proportions occurred between March 11th and 16th, 1936 and again on March 19, 1936.

PHOTOGRAPHIC LABORATORY

The work done in the Photo Laboratory during the year 1936 was about double that for 1935, more than half of it being concentrated in the last two months of the year in connection with photostating of documents pertaining to the investigation of the actions of the City Commissioners. At the rates charged by commercial studios the total value was about \$18,000, an increase of about \$9,000 over the 1935 work. The cost of supplies and services for this work was about \$9,000. Work done for the Division of Water, which bears the entire expense of the laboratory amounted to about \$1,300.

Arrangements were made for a rather complete rearrangement of wiring and control apparatus on the electric generating plant supplying the blue-print machine.